Amendments to the Claims

1. (Currently Amended) A method of transmitting signals from a transmitter comprising three or more antennas in a wireless telecommunications network, comprising:

space-time block encoding at least one data sequence;

applying to the data sequence a linear transformation dependent upon knowledge of correlation among the antennas to at least partially compensate the transmitted signals for said correlation, wherein the linear transformation depends on the eigenvalues of an antenna correlation matrix and a ratio of symbol energy to noise variance; and

transmitting the encoded and transformed data sequence[.];

wherein the linear transformation further depends on the eigenvectors of the antenna correlation matrix;

wherein:

the transmitter has M antennas where M is an integer greater than two,

the channel correlation matrix has M eigenvalues, denoted $\lambda_{r,1}, \lambda_{r,2}, \ldots, \lambda_{r,M}$,

$\mathbf{E}_S / \sigma^2$ is a ratio of symbol energy to noise variance;

the method further comprises calculating values of parameters

$$\beta_i = \left[\left(\frac{1}{\lambda_{r,1}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \left(\frac{1}{\lambda_{r,2}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \ldots + \left(\frac{1}{\lambda_{r,M}^2} - \frac{1}{\lambda_{r,i}^2}\right)\right] \Big/ \left(\frac{\mathbf{E}_S}{\sigma^2}\right), i = 1, 2, \ldots, \mathrm{M}$$, and

the linear transformation is determined from these values and from the eigenvectors ($\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3, \ldots \mathbf{w}_M$) of the antenna correlation matrix.

2. **(Original)** The method of claim 1, wherein the linear transformation is applied prior to block encoding the data sequence.

3. **(Original)** The method of claim 1, wherein the linear transformation is applied after block encoding the data sequence.

4. **(Canceled)**

5. **(Canceled)**

6. **(Currently Amended)** The method of claim ~~5~~ 1, wherein:

$$\mathbf{L} = \frac{1}{\sqrt{M}}\begin{bmatrix} \mathbf{w}_1 & \mathbf{w}_2 & \cdots & \mathbf{w}_M \end{bmatrix}\begin{bmatrix} \sqrt{1+\beta_1} & 0 & 0 & \cdots & 0 \\ 0 & \sqrt{1+\beta_2} & 0 & \cdots & 0 \\ 0 & 0 & \ddots & 0 & \vdots \\ \vdots & \vdots & 0 & \ddots & 0 \\ 0 & 0 & \cdots & 0 & \sqrt{1+\beta_M} \end{bmatrix}$$

7. **(Currently Amended)** A transmitter for wireless telecommunications comprising a space time block encoder, and a linear transformation apparatus operative to transform the data sequence from or to a space-time block encoder to at least partially compensate for correlation between antennas, and the transmitter comprising three or more antennas operative to transmit the encoded and transformed data sequence, the linear transformation apparatus comprising:

a first processor operative to determine an antenna correlation matrix (**R**); and

a second processor operative to:

determine the eigenvalues of the antenna correlation matrix;

determine the ratio of symbol energy to noise variance; and,

determine a linear transformation matrix (L) to be applied dependent upon the eigenvalues and on a ratio of symbol energy to noise variance[.];wherein the linear transformation further depends on the eigenvectors of the antenna correlation matrix; wherein:

the transmitter has M antennas where M is an integer greater than two, the second processor is operative to determine the M eigenvalues ($\lambda_{r,1}, \lambda_{r,2}, \ldots, \lambda_{r,M}$) of the antenna correlation matrix

and to calculating values of the following parameters

$$\beta_i = \left[\left(\frac{1}{\lambda_{r,1}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \left(\frac{1}{\lambda_{r,2}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \cdots + \left(\frac{1}{\lambda_{r,M}^2} - \frac{1}{\lambda_{r,i}^2}\right)\right] \Big/ \left(\frac{\mathbf{E}_S}{\sigma^2}\right), i = 1,2,\ldots,M$$

wherein $\mathbf{E}_S / \sigma^2$ is a ratio of symbol energy to noise variance;

the linear transformation being determined from these values and from the eigenvectors of the antenna correlation matrix.

8. **(Canceled)**

9. **(Canceled)**

10. **(Currently Amended)** A transmitter according to claim ~~9~~ 7, wherein the first processor operative to determine the antenna correlation matrix (**R**) makes the determination from channel estimates.

11. **(Canceled)**

12. **(Canceled)**

13. **(Canceled)**

14. **(Currently Amended)** A linear transformation apparatus operative to transform symbols from or to a space-time block encoder to at least partially compensate for correlation between antennas of a transmitter comprising three or more antennas, comprising: a first processor operative to determine an antenna correlation matrix **(R)**, and

a second processor operative to:

determine the eigenvalues of the antenna correlation matrix;

determine the ratio of symbol energy (E_s) to noise variance; and

determine a linear transformation matrix (L) to be applied dependent upon the eigenvalues and on the ratio of symbol energy to noise variance[.]; wherein the linear transformation further depends on the eigenvectors of the antenna correlation matrix; wherein:

the transmitter has M antennas where M is an integer greater than two,

the second processor is operative to determine the M eigenvalues ($\lambda_{r,1}, \lambda_{r,2}, \ldots, \lambda_{r,M}$) of the antenna correlation matrix

and to calculating values of the following parameters

$$\beta_i = \left[\left(\frac{1}{\lambda_{r,1}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \left(\frac{1}{\lambda_{r,2}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \cdots + \left(\frac{1}{\lambda_{r,M}^2} - \frac{1}{\lambda_{r,i}^2}\right)\right] \Big/ \left(\frac{\mathbf{E}_S}{\sigma^2}\right), i = 1,2,\ldots,M$$

wherein $\mathbf{E}_S / \sigma^2$ is a ratio of symbol energy to noise variance;

the linear transformation being determined from these values and from the eigenvectors of the antenna correlation matrix.

15. (Currently Amended) A method of linear transformation of symbols from or to a space-time block encoder to at least partially compensate for correlation between antennas of a transmitter comprising at least three antennas, the method comprising the steps of:

determining an antenna correlation matrix;

determining the eigenvalues of the antenna correlation matrix; and

determining the ratio of symbol energy to noise variance, and

determining a linear transformation matrix (L) to be applied dependent upon the eigenvalues and on the ratio of symbol energy to noise variance[.]; wherein the linear transformation further depends on the eigenvectors of the antenna correlation matrix;

wherein:

the transmitter has M antennas where M is an integer greater than two,

the channel correlation matrix has M eigenvalues, denoted $\lambda_{r,1}, \lambda_{r,2}, \ldots, \lambda_{r,M}$,

$\mathbf{E}_S / \sigma^2$ is a ratio of symbol energy to noise variance;

the method further comprises calculating values of parameters

$$\beta_i = \left[\left(\frac{1}{\lambda_{r,1}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \left(\frac{1}{\lambda_{r,2}^2} - \frac{1}{\lambda_{r,i}^2}\right) + \ldots + \left(\frac{1}{\lambda_{r,M}^2} - \frac{1}{\lambda_{r,i}^2}\right)\right] \Big/ \left(\frac{\mathbf{E}_S}{\sigma^2}\right), i = 1,2,\ldots,M, \text{ and}$$

<u>the linear transformation is determined from these values and from the eigenvectors ($\mathbf{w}_1$, $\mathbf{w}_2$, $\mathbf{w}_3$,...$\mathbf{w}_M$) of the antenna correlation matrix.</u>

16. (Canceled)